



Technical Assistance

TAR: BAN 39405

# Technical Assistance to the People's Republic of Bangladesh for Preparing the Dhaka Water Supply Project

September 2005

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 31 August 2005)

Currency Unit	–	taka (Tk)
Tk1.00	=	\$0.0154
\$1.00	=	Tk65.11

## ABBREVIATIONS

ADB	–	Asian Development Bank
Danida	–	Danish International Development Assistance
DFID	–	Department for International Development
DWASA	–	Dhaka Water Supply and Sewerage Authority
EIA	–	environmental impact assessment
IEE	–	initial environmental examination
GIS	–	geographic information system
MIS	–	management information system
NGO	–	nongovernment organization
NRW	–	nonrevenue water
Sida	–	Swedish International Development Agency
TA	–	technical assistance
UK	–	United Kingdom

## TECHNICAL ASSISTANCE CLASSIFICATION

<b>Targeting Classification</b>	–	Targeted intervention
<b>Sector</b>	–	Water supply, sanitation, and waste management
<b>Subsector</b>	–	Water supply and sanitation
<b>Themes</b>	–	Inclusive social development, governance, and capacity development
<b>Subthemes</b>	–	Human development, civil society participation, and institutional development

## NOTES

- (i) The fiscal year (FY) of the Government ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends.
- (ii) In this report, "\$" refers to US dollars.

## I. INTRODUCTION

1. During the 2005 Country Programming Mission of the Asian Development Bank (ADB), the Government of Bangladesh confirmed its request for assistance to prepare the Dhaka Water Supply Project. In May 2005, ADB fielded a mission to hold meetings with the government agencies concerned, the Dhaka Water Supply and Sewerage Authority (DWASA), external funding agencies, and nongovernment organizations (NGOs). The status of Dhaka's water supply was ascertained through a review of (i) the history of the water supply, (ii) ongoing projects, (iii) existing and future gaps between supply and demand, and (iv) the planned development program. The Government and ADB agreed that technical assistance (TA) would be provided in 2005. The TA Fact-Finding Mission was fielded from 26 July to 4 August 2005. The Mission's findings were presented to the Government at a wrap-up meeting on 3 August 2005. The Government concurs with the TA goals, purpose, scope, implementation arrangements, cost and financing arrangements, and terms of reference of the consultants.<sup>1</sup> A preliminary design and monitoring framework is in Appendix 1.

2. Dhaka's population is about 12 million and is growing at an estimated annual rate of over 5%. The city is characterized by unplanned expansion, with large squatter settlements in different parts of the metropolitan area. This has burdened an already inadequate infrastructure and caused environmental problems associated with insufficient water supply, sanitation, drainage, and urban flood protection. Deficiencies in water supply and sanitation services have resulted in higher costs for businesses, slower urban economic growth, and social unrest. To meet the growing demand for water, DWASA installs deep tube wells every year. The rate of water extraction from existing aquifers and the declining level of groundwater (para. 5) are alarming and, if unabated, will cause serious shortages, land subsidence, and further environmental degradation.

3. External funding agencies are interested in cofinancing or financing on a parallel basis water supply and sanitation projects for Dhaka. The Danish International Development Assistance (Danida) and the Swedish International Development Agency (Sida) are considering funding, through mixed credits, (i) the relocation of the intake and doubling of the capacity of the existing surface water treatment plant at Saidabad; and (ii) rehabilitation and leak detection. The World Bank has initiated assistance to DWASA in (i) wastewater management, (ii) storm water drainage, (iii) water supply and sanitation services to low-income communities, (iv) social and environmental safeguards, and (v) DWASA performance improvement plan. For components (iii) and (v), close coordination will take place between the World Bank and ADB. The Department for International Development (DFID) of UK is considering providing grant financing to DWASA for slum improvements or institutional development. The Government of the Netherlands has shown interest in funding twinning arrangements with a water supply company in the Netherlands, for which €1.0 million may be available over 4 years. The Government of Japan is actively supporting Chittagong WASA and has expressed its willingness to assist DWASA, subject to the water authority's satisfactory capacity building.

## II. ISSUES

4. **Lack of Adequate Water Supply.** DWASA estimates<sup>2</sup> that it serves safe water supply to about 75% of the population in Dhaka. The number of people who receive piped water in their homes is estimated to be 5.5 million, of which 75% obtain 24-hour supply and 25% an intermittent supply. Another 500,000 have access to piped water via stand posts. An additional

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<sup>1</sup> The TA first appeared in the *ADB Business Opportunities* (internet edition) on 19 July 2005.

<sup>2</sup> All the WASA estimates regarding the existing water supplies, coverage and service level, and overall water demand are subject to confirmation in the field.

3 million people who live in slums obtain bulk supply of water from the DWASA pipe network. The remaining 3 million people receive water from their own supply systems. This includes large private apartment complexes and industries, who pay DWASA a fee.

5. Dhaka is facing an estimated water shortage of about 500 million liters per day (mld)—over 25% of the existing demand. It is estimated this will increase to 1,500 mld in 2015 if no additional sources are developed. About 82% of the existing water supply is from groundwater resources and 18% from surface water. The large-scale abstraction of groundwater and severe groundwater mining has led to a continuous falling of groundwater levels. For example, water levels in Dhanmondi area fell from about 20 meters in the 1980s to 28 meters now. To cope with this problem, DWASA has been drilling new deep tube wells, which now number 400, from 140 in 1990. However, this has resulted in the drying up of several existing wells at a rate faster than previously. Because of the falling water table and erratic electricity supply, even the functioning tube wells cannot be operated at their full potential. The situation is further exacerbated by large nonrevenue water (NRW), which includes technical and administrative losses.<sup>3</sup> Serious water shortages have caused civil opposition, which is now becoming the focus of media coverage. There is an urgent need to (i) address, as a top priority, the issue of NRW through specific structural and nonstructural measures; (ii) develop additional sources for water supply; and (iii) rehabilitate the existing tube wells and distribution network based on technical justification and proper master planning. Since Dhaka has an annual rainfall of about 1,500 mm, rainwater harvesting is a possibility which, together with above measures, would help address the existing shortage.

6. **Poor Water Quality.** The majority of the distribution system is weak because of the intermittent water supply, leakage, and pollution from old and dilapidated sewerage pipes and storm drains. As a result, the incidence of waterborne diseases like diarrhea and typhoid is found among city dwellers. According to DWASA, arsenic problems in Dhaka have not been reported, but iron concentration in the water is common from aquifers of about 150 meters deep. A comprehensive sampling and analysis program is needed to determine baseline quality levels, to be followed by (i) the necessary study and action to ensure quality, (ii) monitoring, and (iii) rectification, if any.

7. **Institutional Weaknesses and Financial Sustainability.** DWASA is struggling with serious operational problems. It is in need of a structured organizational development. The mechanism for tariff revision needs to be rationalized to allow DWASA to implement the Government's water policy without referring to higher authorities. DWASA has already initiated action with regard to consumer surveys and collection efficiency. The Institute of Water Modelling (IWM) is undertaking a study on "Resource Assessment and Monitoring of Water Supply Sources for Dhaka City", which, by December 2005, is expected clearly to define the path to be taken in water source development. It is also undertaking a "Development of GIS based MIS System, Network Analysis and Metering", which will provide the tools to improve the operational efficiency of DWASA.

8. Unauthorized connections, leaks in the system, inadequate operation and maintenance, poor quality of metering and meter reading, and underbilling have led to huge NRW. On top of this, low collection efficiency has increased receivables to around 13 months, which is extremely high by any standard. There is a need to (i) register all the illegal consumers into the consumer database to help improve revenues; (ii) conduct a comprehensive analysis of the existing tariffs

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<sup>3</sup> Technical losses include leaks from the pipelines and connection points, and administrative losses include illegal connections due to theft and pilferage from the system. According to a study for DWASA on an "Immediate action programme to reduce unaccounted for water" carried out in 1995/96, the estimated technical losses are 21% and administrative losses are 31%.

and estimate the appropriate water tariffs to cover costs associated with efficient water delivery; and (iii) build a sound financial management capacity in billing, collection, accounting, and budgeting. Based on lessons learned on earlier projects, DWASA's financial and managerial authority need to be expanded to allow it to recover outstanding dues from government agencies, if any, without political interference. Critical institutional reforms and the active participation of the private sector are essential for future investments. In Dhaka, water services suffer from, among others, underinvestment, overstaffing, low pay, and limited availability of equipment. To rectify these deficiencies, the Government is trying to attract the private sector to the utility services. Of the options for private sector participation, DWASA has chosen to contract out the billing and collection of three of its eight water supply zones to the DWASA Employees' Consumers Supplies Co-operative Society Limited. This move has contributed to a marked improvement in the volume of billing and collection of revenues, was found to be cost-effective, and has resulted in some opportunity gains to DWASA. DWASA now plans to contract out, in phases, the remaining zones to private operators. Based on this, private sector involvement should now increase in other areas of DWASA activities, including operation and maintenance of water supply and sewerage services.

9. The ADB mission in May 2005 presented to the Government a strategy and program for possible ADB assistance following a two-pronged approach: (i) providing the priority infrastructure to address the urgent demand; and (ii) bringing effective institutional and governance improvements, keeping in mind the lessons learned from similar projects in Bangladesh. The Government has endorsed the strategy and accepted that ADB's future assistance would be subject to a satisfactory commitment from the Government in connection with institutional and governance improvements, and appropriate attention to water supply for the urban poor.

### **III. THE TECHNICAL ASSISTANCE**

#### **A. Impact and Outcome**

10. The Project's purpose is to improve living conditions and quality of life of people living in Dhaka, where water quality and access are serious issues. The Project will help DWASA improve safe water supplies, and develop its management for effective and sustainable delivery of services. The TA will prepare a project suitable for ADB financing, and will include (i) the implementation of the zonal approach pilot testing (para. 11); (ii) surveys for the rehabilitation needs for tube wells and distribution system in all zones; (iii) finalization of the short-, medium-, and long-term solutions to augment water supplies based on the outcome of the ongoing study on "Resource Assessment and Monitoring of Water Supply Sources for Dhaka City" (para. 7); (iv) preparation of water supply master plans, including the plans for 24-hour supply to all zones of Dhaka; (v) preparation of recommendations for urgent action regarding the institutional capacity building and staff development of DWASA, and enhancing public-private partnerships to ensure the sustainability of the planned interventions. The TA will provide the overall project design, scope, cost, financing plan, and implementation arrangements, and will formulate the terms of reference for consultants.

#### **B. Methodology and Key Activities**

11. The Government has agreed to the proposed strategy for the development and management of Dhaka water supply. The key elements are (i) a transparent government policy reflecting equitable service levels and tariffs to affect full cost recovery, and (ii) the active participation of civil society to monitor the implementation of Government policy.

12. To prepare and finalize the government policy, a comprehensive water services survey was conducted from June to July 2005 with ADB assistance. The findings will be presented in a stakeholder consultation in late September 2005, at which the policy will be defined and the civil society monitoring team constituted. The Government guaranteed that this policy would be approved by mid-November 2005. To demonstrate civil society's active participation, it has been agreed by the Government of Bangladesh that a zonal approach—initially involving a small, hydraulically isolated pilot area under the water supply distribution—would be adopted. Resources will be concentrated to make the pilot area 100% efficient. All unauthorized connections will be identified, legalized, and metered; defective meters of registered consumers replaced; and all leaks rectified to achieve zero level of NRW. It is envisaged that 100% collection efficiency can be achieved with the active participation of communities and civil society. By raising service levels and its management to an acceptable level, the new approach is expected to work. The project design will include preparing detailed proposals for the replication of this pilot to all other parts of Dhaka. For this purpose, the TA will include (i) comprehensive surveys to identify and design the rehabilitation needs of the water supply system in all zones, and (ii) updating of the consumers database.

13. The TA will also finalize (i) the master planning of Dhaka water supply, including the feasibility of new water sources based on the outcome and recommendations of the studies undertaken by IWM; (ii) advanced action on contract documents for the development of water sources based on the design, build, and operate contract arrangement, and detailed designs for tube well rehabilitation and distribution improvement; and (iii) the work plan for the institutional development of DWASA, in collaboration with the active external funding agencies.

14. Project interventions will give priority to low-income communities and schools with inadequate water supply. The Project will be prepared using community participation, including women's groups, and be implemented, wherever feasible and appropriate, by civil society, nongovernment and community-based organizations. The summary initial poverty and social analysis is in Appendix 2.

15. The TA consultants will undertake a comprehensive organization development of DWASA that will consider (i) staff members' qualifications and skills; (ii) procedures of operations, accountability, and incentives to perform; and (iii) training on technical operations, and financial governance and management.

### **C. Cost and Financing**

16. The total cost of the TA is estimated at \$1,250,000 equivalent, comprising \$532,400 in foreign exchange and \$717,600 equivalent in local currency costs (Appendix 3). ADB will finance the entire foreign exchange cost and \$467,600 equivalent of the local currency cost, totaling \$1,000,000 equivalent. The TA will be financed on a grant basis by ADB's TA funding program. The Government will provide \$250,000 equivalent to cover the remuneration of counterpart staff, provision of office accommodation and facilities, local transportation for counterpart staff, surveys, procurement of goods for the pilot zone, which include water meters and pipes, and additional support to IWM to complete the studies by December 2005. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

### **D. Implementation Arrangements**

17. DWASA will be the Executing Agency for the TA. Important issues will be placed before the DWASA board for its consideration.

18. The TA will be implemented over 9 months from December 2005 to August 2006. Consulting services total 115 person-months: 22 international and 93 domestic. With the exception of the international financial management specialist and environment specialist, an international firm will be engaged to organize the TA activities. The consultants will be engaged by ADB in accordance with its *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the engagement of domestic consultants. A simplified technical proposal with the quality and cost-based selection method will be used to select the international firm. The international firm will contract reputed NGOs or private groups to conduct baseline survey, awareness, and social mobilization. The consultants may procure equipment through direct purchase in accordance with ADB's *Guidelines for Procurement*. Upon TA completion, ownership of the equipment procured under TA will be transferred to DWASA. The outline terms of reference for the consultants are in Appendix 4.

19. The consultants' reporting requirements include (i) detailed team and individual work plans within a week after mobilization, (ii) a draft feasibility report within 26 weeks, (iii) a final report within 30 weeks of TA commencement incorporating comments on the draft feasibility report from the Government and ADB, and (iv) tender documents of the selected contracts within 37 weeks. Tripartite meetings involving the Government, ADB, and the consultants will be held within 2 weeks after the mobilization of consultants, and following the submission of the draft feasibility report.

20. The consumer survey in the pilot zone has been completed. The Government has committed to implementing the agreed action plan of activities (Supplementary Appendix A) strictly in accordance with the agreed time frame.

21. To expedite the ongoing GIS/MIS development by IWM, which is the key to the timely completion of the TA, DWASA agreed to form a special team in each zone to verify the computerized network data as it becomes available from IWM. This will ensure the completion of the work by 31 December 2005, as scheduled.

#### **IV. THE PRESIDENT'S DECISION**

22. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$1,000,000 on a grant basis to the Government of Bangladesh for preparing the Dhaka Water Supply Project, and hereby reports this action to the Board.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Indicators/Targets	Data Sources/Reporting Mechanism	Assumptions and Risks
<p><b>Impact</b> Increase household income and improve health, particularly of poor communities, in the project areas.</p>	<ul style="list-style-type: none"> <li>• Percentage of the population in absolute poverty reduced</li> <li>• Monthly medical expenditures per household reduced</li> </ul>	<p>Annual report of economic survey, the Government</p> <p>Annual Bangladesh resident mission report on Bangladesh economic update</p>	<p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>• Political and socioeconomic conditions remain stable</li> <li>• Government's commitment to the timely completion of the Project remains.</li> </ul>
<p><b>Outcome</b> Improve living conditions in the city by improving water quality and access, and develop management of DWASA for effective and sustainable delivery of services.</p>	<ul style="list-style-type: none"> <li>• Improved access to economic and social services</li> <li>• Maternal deaths reduced</li> <li>• Safe and reliable drinking water provided in all the zones of Dhaka, and water supply coverage improved</li> <li>• Drinking water facilities in all schools ensured</li> <li>• DWASA's running cost of water supply services sustainable with collected water tariff, meeting operation and maintenance costs</li> </ul>	<p>Annual report of economic survey, Government</p> <p>Hospital reports</p> <p>Health management information system</p> <p>ADB review missions reports</p> <p>Project completion report</p> <p>Project performance monitoring system reports</p> <p>Financial records and management information system of the <i>pourashava</i> (municipality)</p>	<p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>• Competent Government staff continue to be available for management, design, and supervision</li> <li>• Competent contractors are available, and competitive bidding of contracts is carried out</li> <li>• Government funding is available in accordance with loan disbursement schedule</li> </ul> <p><b>Risks</b></p> <ul style="list-style-type: none"> <li>• Political environment may destabilize and delay implementation of the Project</li> <li>• Major flood occurs and stops implementation</li> </ul>
<p><b>Outputs</b></p> <ul style="list-style-type: none"> <li>• In-depth experience on method of bringing areas under 24-hour water supply regime</li> <li>• Quantified network status</li> <li>• Up-to-date records on house connection status in Dhaka</li> <li>• Network management and design system</li> <li>• Rehabilitation contracts for implementation</li> <li>• DBOT contracts for implementation</li> <li>• Increased efficiency of DWASA to act as commercial enterprise</li> </ul>	<ul style="list-style-type: none"> <li>• Pilot area identified by 1 August 2005</li> <li>• Consumer survey in pilot area completed by 31 August 2005</li> <li>• Pilot area testing completed within 3 months of fielding consultants</li> <li>• Remedial network actions defined within 4.5 month of pilot testing</li> <li>• Overall connection survey in all zones completed within 5 months from the start of the TA</li> <li>• Master plan is completed within 5.5</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly project and DWASA performance and progress reports</li> </ul>	<ul style="list-style-type: none"> <li>• IWM studies on resources completed on time and GIS/MIS network data entered into the database and can be used</li> <li>• Connection surveys are completed on time</li> <li>• Effective stakeholders participation and ownership developed</li> </ul>

<b>Design Summary</b>	<b>Performance Indicators/Targets</b>	<b>Data Sources/Reporting Mechanism</b>	<b>Assumptions and Risks</b>
<ul style="list-style-type: none"> <li>• Improved revenue collection against reduced NRW</li> <li>• Improved management systems</li> </ul>	<p>months from start of consultants input</p> <ul style="list-style-type: none"> <li>• DBOT documents are complete at 8.5 months</li> <li>• NRW indicator shows steady decline</li> </ul>		
<p><b>Activities with Milestone</b></p> <ol style="list-style-type: none"> <li>1.1 Identification of pilot zone and documentation of complete network and social details by end of September 2005.</li> <li>1.2 Implementation of pressure testing and leakage removal end of Nov. 2005.</li> <li>1.3 Bringing area under 24-hour supply condition by end of December 2005.</li> <li>2.1 Completion of IWM contracts by end of March 2006.</li> <li>2.2 Completion of consumer survey in all other area by end of April 2006.</li> <li>2.3 Identification of remedial actions for all other zone by end of May 2006.</li> <li>2.4 Revision of network design by end of March 2006.</li> <li>2.5 Completing connection survey for whole of Dhaka by end of March 2006.</li> <li>2.6 Preparation of water supply master plan by end of March 2006.</li> <li>2.7 Contract documentation for network rehabilitation by end of April 2006.</li> <li>2.8 DBOT documentation for surface water treatment plants by mid-August 2006.</li> <li>2.9 Upgrading program by end of July 2006.</li> <li>3.1 Strengthening DWASA by end of February 2006.</li> <li>3.2 Training on technical, administrative and financial aspects by mid-August 2006.</li> </ol>		<p><b>Inputs</b></p> <p>Eight international (22 person-months) and 18 domestic (93 person-months) specialists</p> <p>Total cost of \$532,400 in foreign exchange and \$717,600 equivalent in local currency costs.</p> <p>ADB: \$1 million (\$532,400 in foreign exchange and \$467,600 equivalent of the local currency cost).</p> <p>Government: \$250,000 equivalent</p>	

ADB = Asian Development Bank, DBOT = Design, build, operate, and transfer, DWASA = Dhaka Water Supply and Sewerage Authority, NRW = Non-revenue water, TA = technical assistance

Note: Specific targets regarding the performance indicators for the impact and outcome would be carefully determined during the implementation of the TA.

## INITIAL POVERTY AND SOCIAL ANALYSIS

### A. Linkages to the Country Poverty Analysis

<b>Is the sector identified as a national priority in country poverty analysis?</b>	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No	<b>Is the sector identified as a national priority in country poverty partnership agreement?</b>	<input checked="" type="checkbox"/> Yes  <input type="checkbox"/> No
<b>Contribution of the sector or subsector to reduce poverty in Bangladesh:</b>			
<p>Rapid urbanization and steady rural-urban migration of the poor in search of employment and economic opportunities is inflating the urban population in Bangladesh. Results obtained from the <i>Household Income and Expenditure Survey 2000</i><sup>3</sup> indicated an increase in urban poverty from 29.5% in 1995/96 to 36.6% in 2000. Around 25% of the country's population lives in urban areas, and the majority of them fall in the poor and low income category. Thus, reducing vulnerability and providing safer living environment with basic facilities in the urban areas is important. According to the survey, only 32.06% of the urban households had access to drinking water supply and, 66.93% were dependent on tube well water. Supply of safe water is essential in reducing the vulnerability of the poor, particularly in reducing diseases and improving health.</p> <p>Dhaka city, the capital and center of all economic and administrative activities in Bangladesh, attracts migrants from all over the country. It is the most populous city in the country with a population of about 12 million, and a density of more than 5,000 persons per square km. In the Dhaka metropolitan area, at least 5 million people live below the poverty line and the majority of them are residents of mostly shanty and squatter settlements of the low-lying areas or vacant lands. These settlements with a population of low-income groups lack urban infrastructural facilities like paved roads, water, sanitation, sewerage, and waste disposal system. There are over 4,500 slum and squatter settlements and the total number of households in these settlements was estimated at 112,670 and 8,250 respectively, accommodating more than 1.1 million poor according to a survey by Coalition for Urban Poor in 2003. According to Dhaka Water Supply and Sewerage Authority (DWASA), it serves safe water supply to about 75% percent of the city's population and the deficit of water stands about 500 million liters per day. As a result, people, particularly those in poor areas and low income communities (accounting for 25% the population), receive water legally or illegally and pay high fees to various stakeholders. Use of unsafe water makes them prone to diseases. In some areas of the city, the health-related expenditure is high because of polluted water. Moreover, Dhaka faces flooding during monsoon, often due to blockage of sewerage and drains. Damage of water infrastructure, leakage, and water clogging during monsoon leads to scarcity of safe water and increased suffering of the low-income groups and residents of the low-lying areas—making their living conditions deplorable.</p> <p>The National Poverty Reduction Strategy (NPRS) emphasized the need for safe water. One of the seven-point strategic agenda of the NPRS is water and sanitation. The goal of NPRS is to reduce the number of people who do not have access to safe water (26%) by half in 2006 and to reduce water pollution. One of the supporting strategies is effective delivery of services through public-private partnership. Improving water supply infrastructure in urban areas and ensuring quality services were identified as prerequisites for hygiene and nutrition, and contributes to poverty reduction by reducing health risks and creating employment. The NPRS also envisages introducing water supply projects for all urban areas and monitoring water quality. The water supply programs need to focus on providing basic services and the participation of private and public sectors, in collaboration with strengthened local government institutions.</p> <p>The Asian Development Bank (ADB) has been supporting the Government's efforts to ensure safe water supply to the urban population. ADB has supported six development projects for secondary towns in Bangladesh since the 1980s. The proposed technical assistance project to be implemented by DWASA is expected to (i) design a project to help find short-, medium- and long-term improvement in the water supply situation in Dhaka metropolitan city area, (ii) prepare a master plan, and (iii) design appropriate public-private partnership interventions to ensure quality services and access of the poor to safe water. Partnerships with civil society, nongovernment organizations (NGOs), and community-based organizations will be assessed to significantly contribute to reducing urban poverty and consolidate the gains made so far in the area.</p>			

### B. Poverty Analysis

#### Targeting Classification: Targeted intervention

**Poverty Analysis:** The TA will undertake a detailed poverty analysis. During the TA, survey data will be required to estimate access of various urban groups to drinking water facilities, modes of water delivery, time spent by women and children in collecting water, estimated cost of various modes by area, affordability of water for low income groups, capacity of DWASA to serve the poor, and direct and indirect poverty impact of the services. Limited-size (qualitative and quantitative) survey data will be combined with available more comprehensive data sets.

During the feasibility study, the channels of effect need to be identified, to: (i) see how costs will be incurred and benefits realized, (ii) identify gains from distributing project effects; (iii) determine how much cost burden can be acceptable to

those who will pay, (iv) identify overall project performance and returns on equity consideration, and (v) identify modifications of project design and components to enhance impact on target beneficiaries.

### C. Participation Process

Is there a stakeholder analysis?  Yes  No

Preliminary stakeholder consultation was done during the TA Fact-Finding Mission. The TA will prepare a stakeholder analysis, indicating roles of various stakeholders in delivery and receipt of the project services.

Is there a participation strategy?  Yes  No

The TA will involve various stakeholders, including the Government, NGOs, civil society groups, City Corporation representatives, citizens, including representatives of low-income groups in identifying, planning, implementing, and monitoring project components and activities through consultation and joint planning workshops. The role of other development partners will also be assessed.

Form and level of participation of various stakeholders in the loan project implementation phase will be identified and a stakeholders' participation plan will be prepared to ensure quality participation of various stakeholders.

### D. Gender Development

#### Strategy to maximize impacts on women:

In Dhaka city, women and the homeless make up a large proportion of the population. The TA will analyze the needs, and suggest means to address gender concerns in activities related to the development of water supply facilities, operation and maintenance, delivery of services, collection, and use at household levels. The TA will recommend ways for the Project to create scope for women's participation in project activities, from participatory project planning to implementation, monitoring, and evaluation. It will recommend how to generate employment opportunities for women by involving them in different activities. The role of local government, especially of female ward commissioners representatives in participatory service delivery and promotion of women's involvement in various activities will be examined and recommendations made.

Has an output been prepared?  Yes  No, Will be prepared during project preparatory TA

### E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Land is generally owned by the Government. As such, involuntary resettlement is unlikely. However, this will be screened during the TA for all proposed interventions to avoid displacement and/or dispossession. A resettlement framework will be prepared for guidance in preparing a satisfactory resettlement plan, if required, and arrangements to deal with losses on a transparent, voluntary basis will be included in resettlement plans, with appropriate safeguards.	<input type="checkbox"/> Full <input checked="" type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	The TA will recommend linkages and partnerships with local government and nongovernment organizations to ensure that low-income households and the poor have greater access to services, including better use of the services.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	No significant labor implication is expected. Employment opportunities will be examined and recommendations made for a labor strategy to ensure equitable work opportunities, remove unfair gender discrimination and improve employment and working conditions.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

<b>Indigenous Peoples</b>	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Indigenous peoples are not in significant number in the city and, therefore, any significant impact is unlikely. Indigenous issues will be examined during the TA for the proposed project activities. Specific action and an indigenous peoples framework will be proposed, if needed.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>Other Risks and/or Vulnerabilities</b>	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	Ownership and commitment to project strategies and interventions will be ensured through extensive stakeholder consultations and the use of participatory approaches in project planning and design, thus addressing potential needs of low income groups and women. Ownership and roles of various stakeholders agencies like Dhaka WASA, DCC, Rajuk etc. have to be well-coordinated to achieve the results.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

<sup>a</sup> Bangladesh Bureau of Statistics. 2003. *Report of the Household Income and Expenditure Survey*. Dhaka.

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Asian Development Bank (ADB) Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	440.0	0.0	440.0
ii. Domestic Consultants	0.0	279.0	279.0
iii. NGOs	0.0	24.0	24.0
b. International and Local Travel	18.0	0.0	18.0
c. Reports and Communications	6.6	0.0	6.6
2. Equipment (Computer, Printer, etc.) <sup>b</sup>	12.5	0.0	12.5
3. Workshops and Training	0.0	6.0	6.0
4. Vehicle Rental	0.0	13.5	13.5
5. Pilot testing and related costs <sup>c</sup>	0.0	100.0	100.0
6. Miscellaneous Administration and Support Costs	0.0	0.0	0.0
7. Representative for Contract Negotiations	4.5	0.0	4.5
8. Contingencies	50.9	45.1	96.0
<b>Subtotal (A)</b>	<b>532.4</b>	<b>467.6</b>	<b>1,000.0</b>
<b>B. Government Financing</b>			
1. Office Accommodation and Transport	0.0	60.0	60.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	50.0	50.0
3. Additional Support to IWM	0.0	20.0	20.0
4. Water Quality Testing and Leakage Repair	0.0	100.0	100.0
5. Communication	0.0	20.0	20.0
<b>Subtotal (B)</b>	<b>0.0</b>	<b>250.0</b>	<b>250.0</b>
<b>Total</b>	<b>532.4</b>	<b>717.6</b>	<b>1,250.0</b>

IWM = Institute of Water Modeling, NGO = nongovernment organization.

<sup>a</sup> Financed by ADB's technical assistance funding program.

<sup>b</sup> Four computers, one printer, and other office equipment will be purchased by the consultant in accordance with ADB's *Guidelines for Procurement*. The equipment will be given to the DWASA upon completion of the technical assistance.

<sup>c</sup> Pilot testing and related costs include survey cost, system pressurization and repair, social motivation and participation from project side.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The consultants will work closely with the staff of the Dhaka Water Supply and Sewerage Authority (DWASA) and will coordinate with low-income communities, community based organizations, nongovernment organizations (NGOs), civil society groups, and the private sector to foster a high level of beneficiary participation and local ownership of the Project. The consultants will coordinate with other funding agencies involved in water supply and sanitation projects in Dhaka city, and review participatory approaches with poor communities, available documents, reports, and other reference materials. The consultants will review the lessons learned from earlier projects, including also the power sector projects in Bangladesh where similar interventions were made, and structure the new project. In preparing social assessments, the consultants will use the Asian Development Bank (ADB) *Guidelines for the Incorporation of Social Dimensions in Bank Operations* (1993) and the *Handbook for Incorporation of Social Dimensions in Projects* (1994). Any initial environmental examination (IEE) will be prepared in accordance with ADB's *Environment Policy* (2002), *Operations Manual* Section 20, *Environmental Considerations in ADB Operations* (2003) and the *Environmental Guidelines for Selected Infrastructure Projects* (1993). Past ADB studies in Bangladesh should also be used. For economic analysis, the consultants will use the ADB *Guidelines for Economic Analysis of Water Supply Projects* (1998) and for financial analysis, the *Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB* (2002). Table A4 summarizes consulting inputs for the TA.

**Table A4. Consulting Services** (person-months)

Expertise	International	Domestic
Water supply engineer (team leader)	9	
Water supply engineer (deputy team leader)		9
Hydro-geologist	2	2
Communications specialist		3
Demographic planner	1.5	3
Institutional/organizational development specialist	2.5	4
Financial management specialist/financial analyst	2	4
Economist	1.5	2
Environment specialist	2	3
Resettlement specialist		3
Social and gender specialist		2
Water design engineer		7
Water treatment engineer	1.5	3
Staff development trainers		18
Technical support staff		30
<b>Total</b>	<b>22</b>	<b>93</b>
Nongovernment organizations (awareness raising, social mobilization, and baseline surveys)		24

Source: Asian Development Bank estimates.

2. **Team Leader/Water Supply Engineer, and Deputy Team Leader.** The team leader's task will include the following: (i) Ensure delivery of reports in a timely manner, fully integrating the outputs of the domestic experts. Prepare the summary final report following ADB format for Board documents. (ii) Prepare individual work plans, supervise all field investigations and

network testing, and ensure strong involvement of stakeholders in the network testing and repair. This includes the priority implementation of the activities reflected in the action plan (Supplementary Appendix A) for the zonal approach pilot testing. (iii) Develop a project performance management system with sufficient baseline data to establish quantifiable, measurable, and realistic targets for the Project, with specific information on the reduction in nonrevenue water component. (iv) Supervise the house connection data collection for Dhaka. (v) Prepare a framework for implementing the rehabilitation works identified during the TA study. (vi) Supervise and provide actual input to the preparation of the Dhaka water supply master plan. (vii) Monitor the results of the institutional strengthening efforts within DWASA. (viii) Prepare the terms of reference for consultants involved in implementation management and supervision. Look at the least-cost options, and ways and means of reducing operation and maintenance costs.

3. The responsibilities of the team leader as water supply engineer include the following: (i) Be responsible for the analysis of all data including demand analysis, water metering, and, in coordination with financial analyst and economist, complete the tariff study and policy on tariff structure. (ii) Oversee the updating of the consumer database following the citywide surveys to bring all illegal and unregistered consumers into the DWASA database to help improve revenues. (iii) In consultation with the Government, determine the nature, extent, and location of water supply rehabilitation components, with emphasis on providing piped water through house connections. (iv) Using the DWASA geographic information system/management information system (GIS/MIS), verify the functionality of the water supply network and recommend modifications to overcome friction losses due to undersizing of the reticulation network. (v) Explore significant private sector participation in service delivery and revenue collection including public-private partnership, and prepare recommendations.

4. The deputy team leader, also a water supply engineer, will assist the team leader to accomplish these tasks, direct the water supply design engineer in determining the network modifications, and direct the support staff in preparing the contract and bidding documents for the rehabilitation of the existing system.

5. **Hydro-geologist.** The consultant will have the following responsibilities: (i) Review and evaluate the findings of the IWM “Resource Assessment and Modeling of Water Supply Sources” on the appropriateness of the recommendations in securing the future water supply to Dhaka. (ii) Examine the design, construction, maintenance, and operation of all existing operational tube wells. (iii) In conjunction with the water treatment engineer, arrange for water quality tests on proposed surface waters. (iv) Prepare a report on findings and provide guidance for developing new tube wells, based on location, depth, design, operation, and maintenance. (v) Evaluate the hydro-geological investigations and detailed assessment of alternative water sources, and verify the plan for future investigations by DWASA. (vi) Provide terms of reference and cost estimates for new tube well construction and pumping, including test wells and overall testing to validate the yield and quality of water.

6. **Communications Specialist.** The consultant will have the following responsibilities: (i) Establish lines of communication with the active local community groups, organizations and leaders. (ii) Prepare the communication materials required for informing and involving the community in the pilot testing. (iii) Encourage the community and obtain their active support in eliminating water leakages within the compound and from the taps. (iv) Create an understanding of the benefits of having 24-hour water supply and the need to conserve water. (v) Have the community conduct regular information dissemination meetings with the involvement of the local leaders. (vi) Keep the community up-to-date on developments. (vii) Refine the presentation

material on the basis of the responses from the community and prepare the completion report at the end of the testing phase for use in future replication of the adopted methodology.

7. **Demographic Planner.** The consultant will (i) evaluate the available population projections for the growth of Dhaka; (ii) interact with the Planning Department of Capital City Development Authority, and the relevant government departments on the projections for the densification and future development of the city; (iii) develop a land-use concept for the situation in 2025, indicating the density of development; (iv) review the census data and reports relating to the income distribution within the population in Dhaka and prepare projections on the possible shifts in income that may take place within the planning horizon; and (v) recommend the preferred development scenario.

8. **Institutional/Organizational Development Specialist.** The consultant will (i) review the administrative and operational performance of DWASA as a water supply service provider, including the maintenance of its assets in the field; (ii) critically review the (a) lessons learned from earlier projects, to be incorporated into the commercial corporate structure; (b) lines of communication within DWASA; and (c) delegation of powers and responsibilities; (iii) review DWASA's mission statements, objectives, human and financial resources, management capability, autonomy, scope of work, and public reporting; (iv) evaluate DWASA's capability to implement the project components and operate and maintain existing and new water supply facilities and services; (v) prepare a work plan for staff organization within the overarching work plan, (vi) refine the terms of reference for the technical, administrative, and financial trainers for the staff development effort; and (vi) undertake the assignment in consultation with the financial management specialist.

9. **Financial Management Specialist/Financial Analyst.** The responsibilities of the consultant will include the following: (i) Assess DWASA's financial management as an executing agency, vis-à-vis other related projects. (ii) Analyze the (a) income and expenditures in the audited annual reports in relation to the volume of water produced and sold, and (b) the maintenance level compared with other water supply authorities in the region; and propose the budget required to maintain the assets held by DWASA. (iii) Review commercial accounting procedures, record keeping and management reporting formats. (iv) Propose measures to further streamline commercial financial and administrative practices, and improve the efficiency of reporting and accuracy of essential data reported for management. (v) Explore public-private partnership arrangements for DWASA. (vi) Review the cost estimates, including computation of price contingencies and interest and other chargers during construction. (vii) Prepare the financing plan, and assess the reliability of financing sources. (viii) Complete projected financial statements for revenue-generating components and projected incremental costs for nonrevenue generating components. (ix) Compute, among others, the financial international rate of return and weighted average cost of capital for revenue generating components. (x) Assess the project's financial viability and sustainability and determine that sufficient project management controls are in place to support project monitoring and supervision. Review the cost recovery policy tariff collection mechanism, and present water and sewerage charges and in consultation with the Government, propose revisions to these bearing in mind the overall objective, and various measures of full cost recovery.

10. **Economist.** The economist will have the following responsibilities: (i) Undertake economic analysis in accordance with all relevant ADB publications. (ii) Analyze the costs and benefits of each option of water supply, and prioritize proposed schemes by net present value at a 12% discount rate. (iii) Rank proposed schemes in order of cost-effectiveness. (iv) Analyze

the affordability and willingness to pay for each option, estimate demand, and develop a tariff scheme in cooperation with the financial analyst.

11. **Environment Specialist.** The consultant, in close cooperation with the national environmental protection agency, will undertake the following: (i) Prepare a comprehensive initial environmental examination (IEE) report for the Project in accordance with ADB's policies and guidelines. Determine the need for an environmental impact assessment (EIA). If an EIA is not required, prepare a summary IEE with clear recommendations for environmental mitigation measures, associated costs, and monitoring systems. If an EIA is required, prepare detailed terms of reference for the EIA. The reports should give special attention to water treatment sites. (ii) Prepare an outline of the water quality monitoring program. (iii) Undertake public consultations (including affected people, NGOs, and other related agencies) and document the results in the IEE. (iv) Provide project-specific and quantitative information on potential positive and negative environmental impacts. (v) Help DWASA develop an environmental management plan to cover project-specific environmental mitigation measures, and environmental monitoring plan. (vi) Work closely with the local environmental protection authority to confirm the practicability of the environmental management plan and ensure DWASA's compliance with all Government environment assessment requirements and regulations.

12. **Resettlement Specialist.** The consultant will do the following: (i) Review the resettlement requirements related to land acquisition for the Project components. (ii) Update the initial resettlement checklist. (iii) Review the Government policy on resettlement, particularly the entitlement matrix, and identify where it differs from the ADB policy on resettlement. Since the subprojects would provide direct benefits to communities, and are amenable to a local decision-making process, arrangements on dealing with losses on a transparent, voluntary basis—with the appropriate safeguards that could be built into the community decision-making process—will need to be included in resettlement plans. Such safeguards include (i) consulting with landowners and any non-titled affected people (APs); (ii) ensuring that voluntary donations do not severely affect the living standards of APs, and are directly linked to their benefit, with properly documented and agreed community-sanctioned measures to replace any losses; (iii) documenting and verifying (by an independent third party) any voluntary donation; (iv) providing adequate grievance redress mechanisms set out in a resettlement framework; and (v) preparing, if necessary, a resettlement action plan for the Project.

13. **Social and Gender Specialist.** The consultant will undertake the following: (i) Organize and analyze the socioeconomic survey results including slum, squatter, and underserved areas; and collect baseline data on income and expenditures, health, welfare, sanitation, urban environmental situations, and other related social circumstances. (ii) Review the impact of the proposed Project on women and the poor. Identify all possible options to enhance the participation of beneficiaries, particularly women, in all project phases. (iii) Review the Project's impact on indigenous and/or ethnic groups. (iv) Prepare a gender analysis in accordance with ADB guidelines and show the distribution of the expected direct and indirect benefits. (v) Analyze poverty incidence, including the projected growth of urban poverty, and describe the nature and characteristics of poverty. (vi) Prepare summary of poverty reduction and social development strategy based on the standard format.

14. **Water Design Engineer.** The consultant will have the following responsibilities: (i) Update the nodal demand data in the GIS/MIS system to be able to model the hydraulic performance of the network. (ii) Quantify the dimensional deficiencies in the network. (iii) Prepare the necessary documentation for the rehabilitation of the network in stages. (iv) Prepare the contract documents and cost estimates for the different contract packages,

including the international tendering on the basis of design and build of the water intake structure(s). (v) Guide the support staff in preparing the drawings and tender and/or contract documents.

15. **Water Treatment Engineer.** The consultant will (i) obtain the water quality test results of the raw water supply sources; (ii) prepare the concept design for the surface water treatment plants; (iii) prepare the tender documents for international tendering on the basis of design, build, operate and transfer of the treatment plants; and (iv) prepare an estimate of construction and operational cost, with a tentatively unit cost per m<sup>3</sup> water delivered to the network.

6. **Staff Development Trainers.** The staff development program will comprise three trainers who will have the following responsibilities:

- (i) **Technical trainer.** The specialist will train on managing the system, visit all zones on every month and receive overviews of key indicators such as numbers of (a) new connections, (b) regularized connections, (c) preventive maintenance on equipment in their respective categories, (d) volumes of water produced, (e) electricity consumed, (f) hours pumped, and (g) defects and leakages detected and repaired.
- (ii) **Administrative trainer.** The specialist will (a) review administrative practices with respect to flow of information, (b) review performance evaluations and career development plans, (c) identify areas for improvement and obtain approval for effecting the changes, and (d) review the procedures for addressing the issue of defaulters from identification to full cost recovery.
- (iii) **Financial trainer.** The specialist will (a) provide training in the day-to-day commercial accounting practices and procedures, (b) implement monthly reporting systems that provide details on payment of dues (electricity), revenue billed and collected, income over expenditure per zone; and (c) oversee the correct methodologies for maintaining commercial accounting records, budget, and annual account statement preparations.

7. **Technical Support Staff.** The technical support staff will assist the water supply engineer in preparing the master plan and the necessary tender and/or contract documentation for the rehabilitation of the network.